

- 1 1. A hydrocarbon mixture comprising:
 - 2 an olefin/paraffin mixture having a carbon number range from about C₈ to about C₂₀₊
 - 3 wherein the olefin/paraffin mixture comprises:
 - 4 substantially no oxygenates;
 - 5 between about 1 wt% and 20 wt% olefin wherein at least about 1wt% of the
 - 6 olefin is mono-olefin;
 - 7 at least about 5 wt% n-paraffins;
 - 8 between about 2 and 94 wt% branched paraffins wherein at least about 30% of
 - 9 all branch groups are monomethyl and wherein the ratio of terminal monomethyl
 - 10 branching to internal monomethyl branching is at least about 1:1.5.
- 1 2. The hydrocarbon mixture of claim 1 wherein the ratio of terminal monomethyl branching to
- 2 internal monomethyl branching is at least about 1:1.
- 1 3. The hydrocarbon mixture of claim 1 wherein the n-paraffins are present in an amount of at
- 2 least about 10 wt% and wherein the ratio of terminal monomethyl branching to internal
- 3 monomethyl branching is at least about 1.5:1.
- 1 4. The hydrocarbon mixture of claim 1 wherein the n-paraffins are present in an amount of at
- 2 least about 10 wt% and wherein the ratio of terminal monomethyl branching to internal
- 3 monomethyl is at least about 2:1.
- 1 5. The hydrocarbon mixture of claim 1 wherein the olefin/paraffin mixture is a product of a
- 2 Fischer-Tropsch reaction.
- 1 6. The synthetic fuel of claim 5 wherein the Fischer-Tropsch reaction feed syngas comprises
- 2 10-65% N₂.
- 1 7. A process for producing a synthetic fuel comprising the steps of:

- 2 (a) producing a light Fischer-Tropsch liquid;
- 3 (b) dehydrating all or a part of the FT oxygenates in the LFTL while retaining the
4 olefin content in the LFTL;
- 5 (c) recovering an organic phase from the product of step (b);
- 6 (d) blending the organic phase into a transportation fuel.
- 1 8. The process of claim 7 further comprising the step of (a₁) vaporizing the LFTL before step
2 (b) and after step (a).
- 1 9. The process of claim 8 wherein the dehydrated product from step (b) is in the gaseous state
2 and step (c) further includes condensing the dehydrated product.
- 1 10. The process of claim 9 wherein the heat from condensing the dehydrated product is
2 recycled to at least partially vaporize the LFTL in step (a₁).
- 1 11. The process of claim 7 wherein the light Fischer-Tropsch liquid is produced from a feed
2 syngas having 10-65% N₂.
12. The process of claim 11 wherein the feed syngas is produced by autothermal reformation in
the presence of air.
- 1 13. A hydrocarbon mixture comprising:
- 2 a paraffin mixture having a carbon number range from about C₈ to about C₂₀₊ wherein
3 the paraffin mixture comprises:
- 4 substantially no FT oxygenates;
- 5 at least about 5 wt% n-paraffins;

6 between about 2 and about 95 wt% branched paraffins wherein at least about
7 20% of all branch groups are monomethyl and wherein the ratio of terminal
8 monomethyl branching to internal monomethyl branching is at least about 1:1.5.

1 14. The synthetic fuel of claim 13 wherein the ratio of terminal monomethyl branching to
2 internal monomethyl branching is at least about 1:1.

1 15. The synthetic fuel of claim 13 wherein the n-paraffins are present in an amount of at least
2 about 10wt% and wherein the ratio of terminal monomethyl branching to internal
3 monomethyl branching is at least about 1.5:1.

1 16. The synthetic fuel of claim 13 wherein the n-paraffins are present in an amount of at least
2 about 10 wt% and wherein the ratio of terminal monomethyl branching to internal
3 monomethyl is at least about 2:1.

1 17. The synthetic fuel of claim 13 wherein the base fluid is a product of a Fischer-Tropsch
2 reaction.

1 18. The synthetic fuel of claim 17 wherein the Fischer-Tropsch reaction feed syngas comprises
2 10-65% N₂.

1 19. A process for producing a synthetic fuel comprising the steps of:

2 (a) producing a light Fischer-Tropsch liquid;

3 (b) distilling the light Fischer-Tropsch liquid to obtain a C₈-C₂₀₊ product having C₈-
4 C₂₀₊ hydrocarbons and FT oxygenates.

5 (c) dehydrating all or a part of the FT oxygenates in the C₈-C₂₀₊ product while
6 retaining the olefin content of the C₈-C₂₀₊ product;

7 (d) recovering the dehydrated product;

8 (e) separating the aqueous and organic phases of the dehydrated product; and

- 9 (f) blending the organic phase of the dehydrated product into a transportation fuel.
- 1 20. The process of claim 19 wherein a C₁₀-C₂₀ product is obtained in step (b) and dehydrated in
2 step (c).
- 1 21. The process of claim 19 further comprising the step of (b₁) vaporizing the C₈-C₂₀₊ product
2 before step (c) and after step (b).
- 1 22. The process of claim 19 wherein the dehydrated product from step (c) is in the gaseous state
2 and step (d) further includes condensing the dehydrated product.
- 1 23. The process of claim 23 wherein the heat from condensing the dehydrated product is
2 recycled to at least partially vaporize the C₈-C₂₀₊ product in step (b₁).
- 1 24. The process of claim 19 wherein the light Fischer-Tropsch liquid is produced from a feed
2 syngas having 10-65% N₂.
- 1 25. The process of claim 24 wherein the feed syngas is produced by autothermal reformation in
2 the presence of air.
- 1 26. A synthetic transportation fuel comprising a non-hydroprocessed middle distillate fraction
2 of a crude Fischer-Tropsch synthesis product comprising substantially no FT oxygenates.
- 1 27. The synthetic transportation fuel of claim 26 wherein the fuel has a cloud point of less than
2 or equal to 5°C.
- 1 28. The synthetic transportation fuel of claim 27 wherein the fuel contains less than 1wt%
2 aromatics.
- 1 29. The synthetic transportation fuel of claim 27 wherein the fuel contain less than or equal to
2 1ppm of nitrogen.
- 1 30. A transportation fuel produced by the process of claim 7.
- 1 31. A transportation fuel produced by the process of claim 19.

- 1 32. A blending stock for a transportation fuel produced by the process of claim 7.
- 1 33. A blending stock for a transportation fuel produced by the process of claim 19.
- 1 34. A synthetic transportation fuel consisting essentially of olefins and paraffins without
2 presence of hetero-atoms or additives wherein the transportation fuel has a lubricity
3 measured in accordance with ASTM D-6079 of less than or equal to 0.45mm at 60°C.
- 1 35. A synthetic transportation fuel comprising paraffins and olefins derived from the product of
2 a Fischer-Tropsch synthesis and comprising no hetero-atoms or additives and having total
3 insolubles of less than or equal to 1.5 mg/100 ml measured in accordance with ASTM D-
4 2274.
- 1 36. A synthetic transportation fuel comprising paraffins and olefins derived from the product of
2 a Fischer-Tropsch synthesis and containing no hetero-atoms having a lubricity measured in
3 accordance with ASTM D-6079 of less than or equal to 0.45 mm at 60°C and a stability of
4 total insolubles of less than or equal to 1.5 mg/100 ml measured in accordance with ASTM
5 D-2274.